

post-traumatic headaches have been relieved and the adhesions from meningitis have been eliminated. Furthermore, convulsive states secondary to brain tumor have been accurately diagnosed, and in cases of birth trauma some prognosis as to the exact amount of damage, as well as the future of the child, can be arrived at. In other words, the procedure is definitely indicated in obscure neurological diseases wherein a clinical diagnosis cannot be accurately made or when brain tumor is suspected. This procedure has definite contraindications, as pointed out by Doctor Lindemulder; and in such cases wherein an outline of the brain is desired, ventriculogram is indicated.

I have enjoyed hearing Doctor Lindemulder's paper and I want to congratulate him on simplifying a subject which has heretofore been looked upon as technical, dangerous, and uninteresting.

## RECONSTRUCTIVE PLASTIC AND ORAL SURGERY\*

By ARTHUR E. SMITH, M. D.  
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DISCUSSION by William S. Kiskadden, M. D., Los Angeles; Francis L. Anton, M. D., Los Angeles; George Warren Pierce, M. D., San Francisco.

THE recent economic crisis has brought to our attention an urgent demand for reconstructive surgery. Competition for a chance to start in the business world, more so to maintain a position therein, is so keen that one handicapped by a physical deformity must show a prodigious mentality to be considered. These unfortunate people are innocent victims of circumstance; who are often objects of pity and may even evoke the aversion of their friends. They are prone to become recluses and live somewhat like the marked introvert. They may not become efficient in even the most simple lines of endeavor, resulting in a condition which leads to the establishment of an inferiority complex. Why should we, as medical men, permit such a situation which can so easily be prevented by reconstructive plastic surgery!

There has been a definite trend in our modern civilization towards accentuating beauty in all forms of commercial industry, as is represented by architecture, municipal planning, automobile and aeroplane designing, and even in our personal stationery. This trend, whether or not admitted by the critic, certainly stands out as a definite fact. Employers show a marked tendency to select only those individuals who are personable as well as capable. We, in this community, are particularly confronted with countless demands for the correction of those defects which are magnified by the camera in one of our largest industries, the production of motion pictures. One can readily appreciate the personal economic value of the correction of a slight deformity which may bar chances for advancement in a chosen field. Defects should be corrected in the formative years, thus assuring better results from a cosmetic and psychological standpoint. Observations in the streets, the theatre or the schools evidence the truthfulness of this statement.

\*Read before the General Surgery Section of the California Medical Association at the sixty-third annual session, Riverside, April 30 to May 3, 1934.

## THE FIELD OF PLASTIC SURGERY

The field of plastic surgery which rightfully belongs to the medical profession has been invaded, not only by quacks and charlatans, but by unethical and ill-prepared practitioners as well. By means of unscrupulous and flagrant advertising, these people have placed themselves before the public eye as the ultimate need of anyone seeking beauty or health. This, coupled with the bad results of their "curative art," is exemplified by the fact that we have, in our court records, examples of people seeking redress for the often irreparable damage that they have done. Consequently, the public has a mistaken idea of plastic surgery, and a disrepute has been imposed on this specialty. It is the responsibility of organized medicine to educate the public to the real value and work of the ethical plastic surgeon who is respected by his colleagues.

Many have incorrectly considered plastic surgery to be entirely a development of the recent war. While the progress of reconstructive plastic surgery since that time has been great, literature reveals that successful plastic operations were accomplished centuries ago. Attention was called to this fact in a paper read before the American Surgical Association in 1925, by Dr. John Staige Davis, plastic surgeon at Johns Hopkins University. Tagliacozzi, in 1597, was the first to write a book on plastic procedures, but there were earlier reports of plastic surgery of the face by Benedictus in 1492. The technique as described by Tagliacozzi was forgotten until the eighteenth century, when it was enthusiastically revived by many surgeons who recognized the value of this specialized branch of general surgery.

## INFLUENCE OF THE GREAT WAR ON PLASTIC SURGERY PROCEDURES

The volume of deformities resulting from the recent great war stimulated the establishment of many procedures of plastic surgery which previously were merely experimental. Among the methods of modern advancement, the writer desires to place special emphasis on the value of Gillies' tubed pedicle, the use of a modeling compound method in the application of the Thiersch-graft, the application of mechanical principles in splinting and moulding the tissues, and the cartilage transplant. Plastic surgery of the face and the tissues involving the oral cavity is one of the most difficult branches of surgery from the standpoint of cosmetic appearance and restoration of normal function, frequently in the presence of infection.

## THE AUTOMOBILE A CAUSATIVE AGENT IN FACE DEFORMITIES

The automobile is possibly the greatest factor in producing deformities of the face, especially the nose and jaws. Present day sports, such as boxing, wrestling, football, basketball and swimming, often result in broken noses and jaws, torn and lacerated facial tissues, formation of cauliflower ears, all of which demand repair. Efficient

first-aid surgery does not in most cases produce the desired functional and cosmetic result. Plastic surgery is useful for the removal of scar tissue, especially following destructive action of second and third degree burns, which have produced an unpleasant appearance or impaired function. Reconstruction is needed for the removal of keloids, to correct an unsightly ectropion, or a facial deformity resulting from paralysis of the facial nerve. The restoration of normal functions to children afflicted with congenital cleft palate, and cleft lip, is a credit to plastic surgery. The successful accomplishments of restoration, transplantation and reconstruction of tissues have been so great during the past decade that the larger medical schools throughout the country have established departments of reconstructive plastic surgery.

#### FIELDS OF APPLICATION IN FACIAL DEFORMITIES

Destruction of facial contours caused by depressed fractures of the malar and superior maxillary bones may be restored to normal. Acquired and congenital deformities of the eyelids, with total or partial absence, are easily corrected. Abnormal inverted or everted eyelids, closure of the palpebral opening, drooping of the upper lid, and the presence of a fold of skin extending over the inner angles of the ocular openings, are some of the defects of natal origin which come to the surgeon's attention. Eyebrows can be replaced. Certain unsightly discolorations of the skin resulting from congenital lesions, or those acquired by tattooing, gunpowder and certain chemicals can easily be removed. Included in the field of plastic surgery are the reduction of hypertrophied lips; an ear may be restored or rebuilt by using a metal mould; protruding jaws reduced; reconstruction of secondary deformities produced by badly designed lip closure; restoration of philtrum, cupid's bow and vermilion border line; application of Thiersch-grafts on moulds for the restoration of buccal and labial oral sulci due to obliteration by scar tissue, thus making it possible for patient to wear a dental plate; alveolomectomy, operation for reduction of upper edentulous jaw protrusion for dental prosthesis construction; for the removal of scar tissue causing a distorted socket and placing of new conjunctival fornices capable of carrying an artificial eye; the application of a Thiersch-graft on a thin mould in symblepharon; the rebuilding of an upper or lower lip; the closure of chronic ora-antral sinus; for skin grafting; following the removal of scars which prevent normal movement of joints caused by burns or extensive trauma; for the bony reconstruction of the lower jaw and the establishment of normal facial contour and profile of the soft tissues.

#### THE NOSE IS IMPORTANT AS A BASIS FOR GOOD APPEARANCE

We believe that the nose is the basis of good looks. Cosmetic indications for the correction of an awry or deformed nose must not be undervalued, and impaired breathing must be given

great consideration. It is believed that trauma is the causative factor in at least 75 per cent of these cases. Injury may antedate the patient's memory, for the developing bone and cartilage in early childhood are very tender, and even a slight blow may produce displacement of the nasal bones or deviation of the nasal septum. Such abnormalities cause mouth breathing, which may result in irregular, unerupted or impacted teeth, the formation of abnormal dental arches and protruding jaws. Displaced, undeveloped nasal bones or an injured septum may continue to ossify at a vicious angle. Trauma to the nose in early childhood appears to cause less fibrous adhesions and exostoses than trauma in later life.

#### RECONSTRUCTIVE SURGERY IMPLIES INDIVIDUALIZATION

Reconstructive surgery requires skillful care. No two cases being similar, each must be studied individually and the technique for reconstruction must be carefully outlined and planned prior to operation, if efficient results are to be attained. Photographs of each patient should be taken and preoperative models made. The author has perfected a plastic compound for the making of the negative or mould, which has proven satisfactory because the most exacting detail is reproduced on the positive, or model. This compound is so light and free from irritating qualities that a face mask is taken with the patient's eyes open without producing the slightest irritation to the conjunctivae. It is neither cohesive nor adhesive, making possible its application and removal from eyebrows and lashes without producing discomfort. The positive, which is capable of recording the most minute detail contained on the negative or mould, is very hard, does not expand or contract, is flesh colored in appearance, and is not porous, making it ideal for actual color reproduction of lesions. The face mask or oral impression, if carefully made, will produce an accurate reproduction of the part to be operated. Such lesions as a scar, cleft lip, cleft palate, deformed ear, nose or jaw, can be accurately duplicated in model form. These models are valuable in planning the operation and in the construction of case splints and the outlining of flaps, and for the moulding and reshaping of tissues, in order to restore correct anatomic form, outline and function.

Not only are accurately made models and sharply detailed photographs important preoperative adjuncts, but they are also invaluable as permanent records. In addition, they afford a comparison between the preoperative condition and the results of reconstruction. Obviously, photographs should never be retouched, because the detailed results of the surgery would be camouflaged, and thereby, rendered unscientific.

#### EFFICIENT SURGICAL TECHNIQUE IMPLIES APPLICATION OF PROPER MECHANICAL PRINCIPLES

Success attained from plastic surgery is perhaps due equally to efficient surgical technique and the proper application of mechanics in construc-



Fig. 1

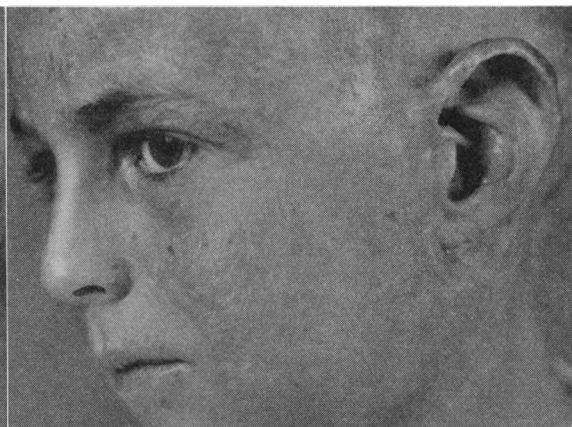


Fig. 2

Fig. 1 (Case 1).—Excessive scarring of left ear and cheek resulting from third degree burns caused by ignited gasoline, followed by keloid formation. Cartilage was involved. The right ear and cheek also badly burned.

Fig. 2 (Case 1).—Illustrating the result obtained from reconstructive surgery followed by x-ray and radium therapy treatments.

tion of patterns and moulds, with the making of definite plans of the operation before the time of actual surgery. Accurate patterns may be constructed of thin rubber, if the operation is to be on the skin surface; of metal if the operation involves transplantation of cartilage or bone. These models, which are sterilized and used at the operating table, should be carefully prepared in order that the cartilage, bone or soft tissues can be properly shaped before being transplanted to the operative field.

The greatest enemies to the plastic surgeon are sepsis, formation of keloids, and inadequate blood supply. A necessity in keeping scars to a minimum is the proper selection of suture material, and the placing of the sutures with accurate coaptation of the incised edges with a minimum of tension.

The day has passed for the injection of paraffin, insertion of ivory, celluloid or other foreign materials, for the partial restoration of a lost part. The constant irritation of these foreign bodies may cause sloughing of the normal tissues, or may lead to cancer. The injection of paraffin is the sheet anchor of the "quack" facial specialist.

An important factor of plastic surgery is the realization of surgical limitation. It is better to do a series of plastic operations, giving nature time to do her part between each procedure, than to try to accomplish too much at one operation. The rebuilding of human tissues requires patience, painstaking care and attention to detail.

#### REPORT OF CASES

The following six case reports have been of particular interest because of the diversity of lesion and application of some of the principles mentioned above.

CASE 1.—Male, aged eight years. When this patient was four years old he received a third-degree burn, caused by his father's cigarette igniting a bucket of gasoline. The healing of the burned areas about the ears, cheeks, lips and neck was rapidly followed by keloid formation, which enlarged to such an extent

that the child's appearance was most unsightly. The keloid formation was difficult to combat. Prior to and following surgery, x-ray treatments proved inadequate and the use of radium was substituted with adequate success. (See Figs. 1 and 2.)

CASE 2.—Female, aged sixteen years. This patient is one of twin girls who, the mother states, were so identical that she had difficulty in differentiating between them before infection caused disfigurement of one. At the age of twelve, a nasal operation followed by infection destroyed a portion of the septum, and this loss of cartilage produced a deep notch in the bridge, thereby causing a shortening and widening of the nose, and an elevated and narrowed upper lip. She was now quite unlike her twin sister, her once beautiful profile being destroyed, and causing her to develop an inferiority complex. The sisters, who dress identically and are inseparable, are motion picture actresses and naturally such a deformity became a travesty. Although artists covered her sunken nasal bridge with wax and make-up for screen work, the defect was still recorded by the camera. (See Fig. 3.)

A reconstructive rhinoplasty was a very delicate procedure, for she asked to be made to look exactly like her twin, as she did before the loss of the nasal septum. The sister's nose was used for a model and guide. Face masks, photographs and models of both girls were made for study and accurate measurements were taken. Two cast metal appliances were constructed. A splint was cast in silver from an impression taken from the carefully sculptured nose, of the desired anatomical shape for the purpose of moulding the tissues during postoperative regeneration of the tissues. A cast metal model was used for exact duplication in cartilage to fill the defect. Two sections of cartilage were removed from the region of the eighth and ninth ribs. One piece was carefully carved similar to the metal model, and the other piece was implanted in the adipose tissue under the skin of the abdomen for future use, if necessary. The results of this reconstructive rhinoplasty and the remodeling of the upper lip were highly satisfactory. In this instance it has meant not only the eradication of a rapidly developing inferiority complex, but the continuation of her success on the screen. (See Fig. 4.)

CASE 3.—Male, aged twenty-two years. Congenital unilateral cleft palate and cleft lip. There is a history of nine operations between the ages of two weeks and fourteen years. The result of these surgical procedures shows an unsightly profile, a very narrow and contracted upper lip, everted lower lip hypertrophied to



Fig. 3

Fig. 3 (Case 2).—Identical twins. Note the nose of the lower twin; how it is shortened, depressed and notched. Also drawn facial expression.



Fig. 4

Fig. 4 (Case 2). Identical twins. Note the profile and improvement of facial expression. Nose reconstruction by transplantation of cartilage from rib and followed by anatomic moulding.

three times its normal size, a large cleft in hard palate, a soft palate wide open and a very short, flat, broad nose. At the previous operations, the surgeon failed to close the clefts in both hard and soft palates, and to reconstruct and remodel the nose. He also excised the premaxillary bones. (See Figs. 5 and 6.)

This patient has suffered all of his life, both functionally and socially, from his bad appearance and his speech impediment. He developed a feeling of being unwelcome in school or in the business and social worlds. The rebuilding of his face and mouth has required many operations, consisting of:

1. Lengthening of upper lip.
2. Reduction of lower lip.
3. Narrowing of nose and reshaping of nares.
4. Closure of cleft in hard palate.
5. Closure of cleft in soft palate by "push back" operation.
6. Construction of special dental appliance.
7. Lengthening of nose and elevation of nasal tip by transplantation of cartilage.
8. Lengthening of columella by utilizing the tubed graft secured from the chest.

9. Widening of upper lip by utilizing the tubed graft secured from the chest.

10. Reconstruction of philtrum and cupid's bow.

This long series of plastic work would have been unnecessary, if the patient had had skillful reconstructive surgery in infancy. He would have been spared, also, an unhappy life of impaired function and mental anguish. (See Figs. 7 and 8.)

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CASE 4.—Female, aged twenty-five years. The nose of this young woman has been injured at birth, due to misuse of forceps. Being in public life as a school teacher, she had developed an inferiority complex. She stated that from early childhood she had been acutely conscious of her deformity, and had suffered mentally because of her appearance. Not only had the acquired nasal disfigurement impaired her personal appearance, but the constricted nares prevented normal breathing. The accompanying photograph, illustrated in Fig. 9, shows the nose to be elongated, with a broad, flat, depressed tip, an excessive "hump" and abnormally shaped nostrils.



Fig. 5



Fig. 6



Fig. 7



Fig. 8

Fig. 5 (Case 3).—Note unsightly profile due to congenital cleft palate, cleft lip and bad surgery. Note short, flat, broad nose, short columella, broad nostrils, retracted upper lip, protruded and hypertrophied lower lip.

Fig. 6 (Case 3).—Note cleft palate, wide nostrils and flattened nose. The premaxillary bones had been excised when a baby.

Fig. 7 (Case 3).—Note the closure of the cleft of soft and hard palates by the Dorrance "push back" operations.

Fig. 8 (Case 3).—Surgery completed. Showing results accomplished from numerous reconstructive operations. Compare profile with Fig. 5.



Fig. 9



Fig. 10

Fig. 9 (Case 4).—An acquired nasal deformity by misuse of forceps at birth. Note the excessive size, prominent "hump" and length.

Fig. 10 (Case 4).—Result obtained from corrective rhinoplasty. Operation "in toto" was done.

The surgery consisted of reducing the protruding nasal bones, shortening and lowering the septum, narrowing and pointing the tip, elevating the columella, reshaping the nostrils and reducing the nasal processes of the superior maxillary bones. The photograph, illustrated in Fig. 10, was taken three months following surgery, and attention is called not only to the improvement in the nasal form but to the facial contour, with a widened upper lip and pleasing expression. This young lady has developed an entirely different mental attitude, is not depressed, and her inferiority complex has vanished due to the restoration of normal breathing and improvement in her personal appearance.

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CASE 5.—Female. This patient gave a history of having a lower right third molar removed with prompt healing of the socket, without pain. Six months later a fistula appeared in the lower right face.

She consulted several doctors and dentists, and numerous x-ray films have been taken. When examined, her only complaint was of a copiously discharging fistula on her right face which required frequent change of dressings.

Examination showed that this patient practiced efficient oral hygiene. No intra-oral lesions could be found. Bacteriological examination of smears, from both the external opening and the inside of the fistulous tract, revealed numerous pus cells, gram-positive and gram-negative bacilli, fusiform bacilli and spirilla. These findings were indicative of Vincent's infection. A small blunt probe was inserted into the fistulous tract, which was found to extend to the third molar socket.

Treatment consisted of opening of the third molar area by incising the apparently healthy mucoperiosteum covering the area. The fistulous tract was treated by irrigations. Two intravenous neosalvarsan injections were given. After three days no discharge



Fig. 11

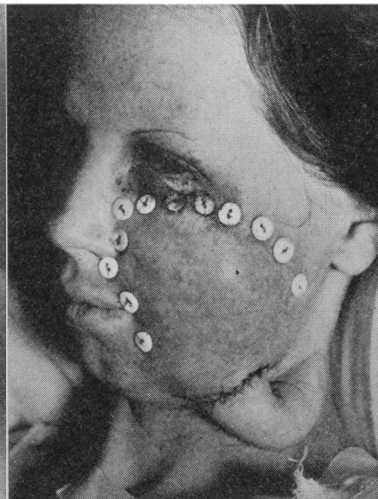


Fig. 12



Fig. 13

Fig. 11 (Case 6).—Illustrating the tubed pedicle graft which was used to reconstruct the left face.

Fig. 12 (Case 6).—Illustrating the tubed graft in position three days after operation. The buttons were used to prevent injury to skin from sutures.

Fig. 13 (Case 6).—Surgery completed. The tubed graft was spread out and inserted through a one-inch incision beneath the left jaw, which restored normal facial contour of the left cheek, eyelid, nasal ala and upper lip.

was apparent, and in ten days the tissues were apparently healed. This long continued infection had caused an adherence of the skin to the mandible at the fistulous opening, destroying the normal surface contour and resulting in an unsightly scar.

The adherent scar was separated from the mandible, the surrounding subcutaneous tissues were approximated, and the normal surface contour was restored.

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CASE 6.—Female, aged twenty-two years. At the age of ten this patient was struck with a baseball on the left side of the face. The impact fractured the anterior wall of the antrum, the malar bone and the infra-orbital margin of the superior maxillary bone. The x-ray revealed almost complete obliteration of the superior maxillary sinus. Examination revealed that the left cheek and the tissues covering the infra-orbital margin were depressed. There was an ectropion of the lower left eyelid, and the left ala was widened and distorted, with the left angle of the mouth drooping and pulled to the left side. The natural contour was destroyed, there being a concave surface instead of the normal convex outline. Measurements revealed that the concavity of the left side of the face was three-quarters of an inch beneath the normal contour line, as compared with that of the right. The thickness of the cheek at the deepest portion of the concavity was an eighth of an inch, and gave the impression to the palpating fingers that only skin and mucous membrane were present. (See Fig. 11.)

A tubed flap containing considerable adipose tissue was prepared from the skin on the left side of the abdomen and was transferred in four steps to the face. An incision, one and one-quarter inches long, was made parallel to the lower border of the left mandible. The skin was carefully loosened from the underlying tissues at the angle of the mouth, beneath the ala, and into the lower eyelid and extending one-half inch anterior to the left ear. The lower end of the tube was opened and the tissue modeled to a form constructed prior to operation. Equidistant sutures were placed in the margin of the flap. The graft was placed in position and the sutures were tied over buttons. Three weeks later the tube was severed, the lower portion of the graft was shaped to the proper contour and the skin incision closed. (See Fig. 12.)

Illustration 13 shows the restoration of normal facial contour and left ala. The lower eyelid and lip are normal and there is restoration of expression.

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#### DISCUSSION

WILLIAM S. KISKADDEN, M. D. (1930 Wilshire Boulevard, Los Angeles).—The author has covered the general field of reconstruction surgery briefly, but thoroughly; and with one or two minor exceptions, I am in accord with his ideas.

It has not been my experience that either total or partial absence of the eyelids is easy satisfactorily to correct. Moreover, my experience with the removal of tattoo marks, skin discolorations, or chemical staining has left a rather deep impression of how difficult, and sometimes disappointing, is the treatment of these conditions.

I am glad that Doctor Smith mentioned the deformity and malformation that may result in noses following slight or forgotten injuries in childhood. I feel that these should be treated conservatively when discovered, and if the distortion is not too severe or disfiguring it is wiser to postpone surgery till the age of sixteen, when growth of the nose has usually ceased. Treatment before this time may give a good immediate postoperative result, but subsequent growth often causes even worse distortion than existed preoperatively.

The treatment of keloid following burns is one of the many ever recurring problems that the plastic surgeon faces. X-ray, of course, in small, divided weekly doses, is of distinct value. However, the implantation of skin in the form of a graft, either split

skin, whole thickness or pedicle in type, will often result in amazing smoothing, thinning, and softening of the surrounding thick keloid. The rationale of early grafting of all burns or denuded surfaces as a preventive against keloid formation and subsequent contraction, is obvious.

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FRANCIS L. ANTON, M. D. (702 Wilshire Medical Building, Los Angeles).—The plastic surgeon must combine science with art to an eminent degree. He must add to these qualifications no small amount of moral courage, because his success or failure is a constant walking advertisement of his work. Good surgical judgment and a great amount of patience are also required. Many of these reconstructive undertakings require months and sometimes years for their ultimate accomplishment, and oftentimes can only be done a step or two at a time.

Great, indeed, however, is the satisfaction of being able to convert a repulsive monstrosity—for instance, a cleft lip or palate case—into an acceptable member of the human society; and it is well worth the time and patience devoted to it. Disabling or disfiguring scars, as well as other and greater deformities, whether congenital or acquired, frequently produce an inferiority complex in the possessor of such defects which makes him very unhappy and reduces his usefulness.

Since well-trained scientific men have become interested in this work and have taken it out of the hands of charlatan beauty specialists, great progress and healthy improvement in the work has developed.

The unsatisfactory and often dangerous injection of paraffin has been replaced by tissue transplantation to fill out defects and sunken areas. Bone and cartilage transplantations are placed where a more solid support is needed. The transplantation of tendons and nerves often produces most wonderful effects in infantile paralysis, and in cases of industrial or automobile accidents.

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GEORGE WARREN PIERCE, M. D. (490 Post Street, San Francisco).—It is true that there is a lack of knowledge concerning the scope and capacity of reconstruction surgery, not only among the laity, but also to a considerable extent throughout the medical profession. However, I wish that Doctor Smith had given us for this meeting less of a catalogue of the possibilities of this specialty and more of discussion of the refined technique that is required in dealing with its varied problems.

I will frankly criticize one of Doctor Smith's statements—that "acquired and congenital deformities of the eyelids, with total or partial absence, are easily corrected." To me, reconstruction of an eyelid for total absence is most exacting and difficult, and if Doctor Smith will tell me how it can be easily corrected I will be most grateful.

Of special interest was the case of correction of the deformities following the badly operated cleft lip and palate. In the light of our present knowledge deformities such as these are inexcusable. The surgeon who undertakes to "do" a cleft lip and palate should be certain that he can offer to the patient a more than fair chance to receive a lip which will offer an almost normal appearance, a reconstituted musculature and function, and a nose whose columella is in midline with alae and nostrils approximately similar. He should be confident that he can give the patient a long palate with mobile velum which will permit speech free from the characteristic cleft palate enunciation.

The majority of surgeons who do a large number of cleft palate operations agree that the use of wires and plates, after the technique of Brophy, is detrimental to the best results, and that their use arrests development of the superior maxillae and is apt to destroy the tooth buds. Far better average results are obtained by reconstructing the lip and nose, and allowing the constant elastic action of the reconstituted orbicularis oris to gradually mold the protruding alveolar process into normal position, which it surprisingly does. The secret of primary healing of the palate

and velum is absence of tension on the suture lines. This can only be obtained by free dissection around the posterior end of the alveolar process. If this freeing of the tissues is efficient, no stay sutures or wires are necessary.

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DOCTOR SMITH (Closing).—I wish to thank Doctor Pierce for his taking exception to my statement, *i. e.*, "Acquired and congenital deformities of the eyelids, with total or partial absence, are easily corrected." Possibly the word "easily" should have been omitted, because all plastic operations of any magnitude upon the face demand painstaking and exacting surgical technique, and also the application of mechanical principles. The results obtained, both functional and cosmetic, from reconstructive operations on eyelids upon patients coming under my observation have been most encouraging and gratifying. In some of these cases the eyelid was not only reconstructed, but eyelashes were restored. Other operations which are difficult are the restoring of an ear, nasal ala, and lip. Restoration of function and cosmetic appearance are paramount. As time passes, and as I become more and more familiar with the almost unlimited intricacies of reconstructive plastic and oral surgery, I am convinced that one not thoroughly trained in this highly specialized branch of general surgery should not attempt it. It is seldom that two plastic or oral cases are alike, therefore each case demands individual study and preoperative planning in order to determine the proper method of reconstruction. The case should be studied from every standpoint. Efficient results are based upon sound surgical and mechanical judgment, and the determining of just what should be done. Surgery of this type cannot be done in a hurry. A single operation of a complicated case may require several hours, due to the great detail and difficulties encountered. In many cases numerous operations are necessary to accomplish a good functional and cosmetic result.

### SURGICAL RELAXATION \*

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DISCUSSION by Caroline B. Palmer, M. D., San Francisco; Mary E. Botsford, M. D., San Francisco; W. V. Chalmers-Francis, M. D., Los Angeles.

**S**URGICAL relaxation is a problem that confronts the anesthetist each time an anesthetic is administered. Considering the various types and conditions of patients that are presented, can full relaxation always be given, maintaining, at the same time, the safety of the patient and acceding to the demands of the surgeon? Let us review, briefly, the more common methods and agents of anesthesia, with consideration of their safety and efficiency.

### SPINAL ANESTHESIA

*Spinal anesthesia*, of all anesthetic agents, in that part of the body affected, gives the most complete relaxation. In recent years its safety has been increased by improved technique, the use of less toxic agents, and also of ephedrin and CO<sub>2</sub> and O. Its effect, however, is limited in duration. This can be controlled to a certain

extent by the amount of the agent administered and, more recently, by the combination with novocain (the most commonly used agent) of such drugs as pantocain and nupercain, which have a longer duration of action than novocain. Pantocain and nupercain are more toxic than novocain, though that, to a degree, is made up for by the smallness of the dose required. Nevertheless, while the safety of spinal anesthesia has been decidedly increased, there still seems much to be desired. Alarming drops of blood pressure continue to occur; likewise, marked circulatory and respiratory depressions. The debate as to its safety still continues, and the great majority decline to use spinal anesthesia for operations above the diaphragm. Mortality has been placed anywhere from one in three hundred to the claim of no mortality whatever. It certainly has its place in anesthesia, especially when used in selected cases, though the popularity of a few years back would appear to be decreasing. There seems to be very little difference in postoperative pulmonary complications between this anesthetic agent and others. The height of the anesthesia apparently is not as controllable as one would be led to believe, similar doses and similar amounts of fluid not infrequently giving quite different results.

*Other forms of regional anesthesia* are decidedly safer than spinal, though occasionally a patient may have an idiosyncrasy against the agent used; and it may show a lack of efficiency in itself and so require the addition of some inhalation anesthetic.

### CHLOROFORM AND ETHER

*Chloroform* gives an excellent degree of relaxation; but its high toxicity and its danger to the patient, both immediate and remote, have rendered its use unjustified.

*Ether* ordinarily gives a good relaxation; and though its toxicity is fairly high, it has a wide margin of safety. It is true that it tends to be somewhat irritable to pulmonary tissue, and is contraindicated in pulmonary affections. Likewise, it is not suitable in cases with kidney complications. Taking it altogether, the writer believes that ether, properly given, has a high degree of safety, and it would seem that postoperative complications, following ether, are due to the location of the operation rather than to the anesthetic agent.

### NITROUS OXID AND ETHYLENE

*Nitrous oxid with oxygen* is a very safe anesthetic when properly given. It is rapidly absorbed and rapidly eliminated. Its toxicity is apparently nil, and muscle tone is not lost. In those cases requiring a full relaxation, it would be necessary to use, in addition to nitrous oxid and oxygen, either a local infiltration or the addition of ether, and proper premedication is absolutely necessary in any case for a smooth anesthesia with this agent. McKesson, by what he terms a secondary saturation, seems to be able in at least the large majority of his cases to obtain relaxation suitable for any case with nitrous oxid and oxygen alone.

\* From Stanford University Hospital.

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